

## CLAIMS

1. A porous sintered compact of titanium oxide for production of metallic titanium through direct electrolytic process, in which it has a porosity of 20 to 65% and a hardness of 60 (HV) or higher.

2. A porous sintered compact of titanium oxide for production of metallic titanium through direct electrolytic process, in which it has a porosity of 20 to 65%, a specific surface area of 0.1 to 5.0 m<sup>2</sup>/cm<sup>3</sup>, and a volume ratio of pores with 0.3 to 100μm diameter to be 10% or higher to the total pore volume.

3. A porous sintered compact of titanium oxide for production of metallic titanium through direct electrolytic process, in which it has a porosity of 20 to 65%, a hardness of 60 (HV) or higher, a specific surface area of 0.1 to 5.0 m<sup>2</sup>/cm<sup>3</sup>, and a volume ratio of pores with 0.3 to 100μm diameter to be 10% or higher to the total pore volume.

4. A process for producing a porous sintered compact of titanium oxide according to any one of claims 1 to 3, comprising using a titanium oxide powder having a grain size of 0.2 to 2000μm, molding it into a required shape with pressurization in a range of 9.8 to 78.5 MPa, and sintering it at 1100 to 1500°C for 0.5 to 10 hours.

5. A process for producing a porous sintered compact of titanium oxide according to any one of claims 1 to 3, comprising adding and mixing 0.1 to 40%, based on mass, of a titanium suboxide powder to a titanium oxide powder followed by molding into a required shape, and sintering the resulting compact at 900 to 1400°C for 0.5 to 10 hours.

6. A process for producing a porous sintered compact of titanium oxide according to any one of claims 1 to 3, comprising using a titanium oxide powder having a grain size of 0.2 to 2000μm, adding and mixing 0.1 to 40 %,

based on mass, of a titanium suboxide powder thereto, molding into a required shape with pressurization in a range of 9.8 to 78.5 MPa, and sintering at 900 to 1400°C for 0.5 to 10 hours.

7. A process for producing metallic titanium, comprising using a porous sintered compact of titanium oxide according to any one of claims 1 to 3, arranging it adjacently to a conductor or closely adhered around the conductor to constitute a cathode, dipping it in a molten salt electrolyte of 800 to 1050°C containing 40 mass % or more of calcium chloride, and reducing it by electric energization.